

## Abstract

Cadmium contamination in Mae Sot, Tak province had been discovered at higher level than a safe guideline. This contamination increases a risk of Cd related disease, especially, bone pathology. This study is applied research to determine bone disease risk and to find out bone disease risk factors among Cd exposed inhabitants. Subjects whose age >50 years old were selected. An exposed group was selected from inhabitants from Cd polluted area with urinary Cd >5  $\mu\text{g/g Cr}$  whereas a control group was selected from the area >15 km far from polluted area with no report of Cd contamination. Urinary Cd was quantified by Atomic Absorption Spectrophotometer, bone mass was determined using Quantitative Ultrasound and Urinary  $\beta_2$ Microglobulin was quantified by Enzyme immunoassay.

A prevalence of permanent proximal tubular dysfunction (Urinary  $\beta_2$ Microglobulin ( $\beta_2$ MG) >1,000  $\mu\text{g/g Cr}$ ) was 43.66% in exposed men and 35.46% in exposed women which were significantly higher than control group. This permanent proximal tubular dysfunction was increased as U-Cd increased. An odds ratios of permanent proximal tubular dysfunction in subject with U-Cd >10  $\mu\text{g/g Cr}$  was 25.729 in men and 5.412 in women compare to subject with U-Cd < 5  $\mu\text{g/g Cr}$ .

A bone T-score was used to indicate osteoporosis risk in exposed group comparing to control group. The result showed that exposed group has a probability of increase osteoporosis risk 1.589 times in men and 1.207 times in women compare to control group. When classify subject according to U-Cd level, a subject with U-Cd >10  $\mu\text{g/g Cr}$  had an increase osteoporosis risk 3.050 times in men and 2.144 times in women comparing to subject with U-Cd < 5  $\mu\text{g/g Cr}$ . An exposed group had a risk of osteoporosis more than control group and cadmium is a risk factor.

Permanent proximal tubular dysfunction was a risk factor for bone pathology. The subject with permanent proximal tubular dysfunction had increase osteoporosis risk 3.080 times in men and 2.862 times in women compare to subject without proximal tubular

dysfunction. This evidence indicate a relation between permanent proximal tubular dysfunction and increase bone disease risk a proximal tubular dysfunction should be followed up in order to control an incidence of osteoporosis.

A population with high exposure of Cd had a high risk for proximal tubular dysfunction and osteoporosis. A proximal tubular dysfunction was a risk factor of osteoporosis in both men and women. This finding was different from previous report which mentioned that women had higher risk for bone pathology than men. An intoxication of Cd was different between population which require a systemic study to explain this phenomenon including Thai. A sensitive biomarker to indicate an abnormal bone metabolism, a bone related vitamin metabolism should be subjected in a study to find out a key factor for health care system in high risk group.